

## OPERATIONAL AND SCIENTIFIC NOTES

**Establishment of *Encarsia smithi* on Kosrae  
for Control of the Orange Spiny Whitefly,  
*Aleurocanthus spiniferus***DONALD NAFUS<sup>1</sup>

## ABSTRACT

*Aleurocanthus spiniferus* (Quaintance) (Homoptera: Aleyrodidae), was first reported from Kosrae in 1982. In 1983, *Encarsia smithi* (Silvestri) (Hymenoptera: Aphelinidae) was released for control of the whitefly. The parasite was recovered in 1984. At that time it parasitized 77 percent of the whiteflies. In 1986, 86 percent of the whiteflies were parasitized.

The orange spiny whitefly (OSW), *Aleurocanthus spiniferus* (Quaintance), was first reported from Kosrae in 1982 by R. Muniappan. He observed heavy infestations and extensive deposits of sooty mold on most of the citrus on the island (R. Muniappan, personal communication). I observed the same situation in March, 1983. On November 15 and 22, 1983, shipments of adult parasites of *Encarsia smithi* (Silvestri) were sent to Kosrae from Guam for possible biological control of OSW. The first shipment consisted of 90 females and 4 males and the second of 150 females and 20 males. A total of 142 wasps survived for release. The parasites were released in small groups on individual tangerine trees in residential or farm areas (Table 1).

From November 13-25, 1984, and again from December 5-11, 1986, I conducted surveys of OSW on tangerine and orange to determine the status of the establishment of *E. smithi*. The number of trees sampled varied depending on how many trees were present at the site (Table 1). From each tree, 20 shoots were randomly selected from those shoots with relatively new, but mature, leaves. These shoots were easily recognized by the size (full-sized) and color (lighter green than old leaves) of their leaves. The newly matured leaves were selected for sampling because they were the site of the most active OSW infestations. All the newly matured leaves on each shoot were searched for OSW. In 1984, to estimate OSW numbers, a random sample of 10 infested leaves per tree was collected from the sample shoots. In 1986, all infested leaves were collected. On each leaf all nymphs and pupa were counted. The mean number per leaf was then multiplied by the proportion of infested leaves to estimate the number of OSW per leaf. In 1984, 3,000 leaves were surveyed on 18 trees. In 1986, 3,600 leaves were examined on 18 trees.

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**TABLE 1.** Parasitization of *Aleurocanthus spiniferus* by *Encarsia smithi* at different localities on Kosrae.

Site	No. parasites released	Km from release point	No. trees surveyed		No. leaves collected		No. OSW reared		% OSW parasitized		No. OSW dead <sup>1</sup>	
			1984	1986	1984	1986	1984	1986	1984	1986	1984	1986
Lelu Island	35	0.0	3	2	20	2	244	3	77	100	3.4	1
Lelu Agr. Stn	10	0.0	6	6	158	6	363	8	72	77	1.2	0
Lelu	—	1.0	1	7	10	8	60	11	90	86	3.5	2
Malem A	31	0.0	2	—	20	—	138	—	52	—	4.2	—
Malem B	—	0.5	1	2	10	2	250	3	1	100	0.0	0
Malem C	—	1.5	1	—	10	—	90	—	57	—	1.5	—
Tafunsak	25	0.0	1	—	10	—	140	—	93	—	0.8	—
Uttwa A	41	0.0	1	1	10	1	197	3	88	100	8.5	0
Uttwa B	—	1.5	1	—	10	—	58	—	87	—	1.2	—
Uttwa C	—	4.5	1	—	10	—	94	—	65	—	2.4	—

<sup>1</sup>In calculating the percent parasitized, dead OSW were not included.

To determine the rate of parasitization, the sample leaves were placed in 0.5 liter white plastic cups to incubate OSW pupa and fourth stage nymphs. On leaves with more than 30 OSW, 30 OSW were marked. On leaves with less than 30 OSW, all OSW of the appropriate ages were incubated. All containers were checked daily and emerged OSW and wasps were removed, counted, and identified. In calculating rates of parasitization, dead OSW were not included.

The only parasite reared was *E. smithi*. *E. smithi* was established at all sites where OSW was present. Prior to my arrival in 1984, the infestation of *A. spiniferus* appeared to have been severe. Virtually all of the upper surfaces of the older leaves were heavily encrusted with sooty mold, which was in the process of peeling off, and the lower surfaces were covered with molding, eclosed OSW pupae. OSW infested nearly 20% of the sample leaves and averaged 4.6 nymphs and pupae per leaf. In 1986, substantially fewer, 0.5%, of the leaves were infested. Only 55 OSW were found on 3,600 leaves; an average of less than 0.02 individuals per leaf. On older leaves, OSW were extremely difficult to find and there was no sooty mold. In 1984, parasitization rates ranged from 1 to 93 percent, typically being between 50 to 90 percent. Overall, *E. smithi* parasitized 77 percent of the *A. spiniferus* examined. In 1986, 83 to 100 percent of the OSW were parasitized (Table 1).

#### ACKNOWLEDGMENTS

I thank Mr. Takumi George and Mr. Glasstine Cornelius of the Department of Agriculture on Kosrae for their help with this project. I also thank the Community College of Micronesia for providing transportation on Kosrae, and the F.A.O., United Nations, for funding my travel to Kosrae. This is publication number 65 of the Guam Agricultural Experiment Station.

